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ABSTRACT

The relative percentages of males and females in illustrations were identified in a select sample of children's science trade books. The books chosen for analysis were the "Outstanding Trade Books for Children 1979." These books were selected as outstanding children's science trade books mainly for grades K-8 and were evaluated by a special Book Review Committee appointed by the National Science Teachers Association in cooperation with the Children's Book Council. Sixty-nine of the total 71 books were analyzed to determine the sex-role content of the illustrations. Findings included, among others, that: (1) most illustrations portrayed individual males and females while few depicted males and females working together and even fewer depicted females as a team; (2) the percentage of group pictures illustrating only males and only females was identical (31%) in biological science books while 38% of the group pictured portrayed males and females together; (3) 77% of the group pictures showed only males while 7% showed only females in the physical science books and 15% illustrated males and females in groups; and (4) an implied sexist definition of career roles in the two physics and chemistry books examined (ratio of 8 males to 1 female). Results indicate that since these outstanding books were evaluated for sexism in the selection process, it could be assumed that many of those not selected would be significantly more sexist. (JN)

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SEXISM IN CHILDREN'S SCIENCE TRADE BOOK ILLUSTRATIONS

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by

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Increasingly, children's science trade books are supplements and even alternatives to textbooks in the elementary science curriculum. Through trade books, a myriad of different topics may be pursued in much greater depth than is possible with most textbooks. The curious child may explore subjects ranging from quasars, pulsars and black holes in space to tropical saltwater aquariums.

The information in most science trade books is significantly clarified and extended through the use of profuse illustrations. Through their interpretations of the narrative, illustrators may strongly influence and sometimes bias the message of the book. Sexism has been a subtle but common bias.

While there are no reports of a systematic analysis of the sexism in science trade book illustrations, there is documentation of sexism in science textbooks. In an extensive analysis of textbooks, Weitzman and Rizzo found that the " . . . percentage of females in illustrations varies from a high of 33% in social studies to a low of 26% in science."[1]

[1]Jeana Wirtenberg, Robin Murez and Rose Ann Alspektor. Characters in Textbooks, A Review of the Literature, Clearinghouse Publication 62 (Washington, D.C.: United States Commission on Civil Rights, 1980), p. 11.

SE 035 004

To determine whether or not a similar quantitative bias exists in children's science trade book illustrations, the present study was designed to identify the relative percentages of males and females in illustrations in a select sample of children's science trade books.

The books chosen for analysis were the "Outstanding Science Trade Books for Children in 1979."[2] These books " . . . were selected as outstanding children's science trade books mainly for grades K-8 published in 1979. Books were evaluated by a special Book Review Committee appointed by the National Science Teachers Association in cooperation with the Children's Book Council."[3]

These books met the criteria for accuracy, readability and pleasing format. Included among the numerous evaluative questions which were considered in the selection process was: "Does the book violate our basic principles against racism, sexism and violence?"[4]

In the present study, 69 of the total 71 books were analyzed to determine the sex-role content of the illustrations. Two of the books could not be located at the time of the study. Each book was assigned to one of twelve subject categories.[5]

[2]"Outstanding Science Trade Books for Children in 1979." Science and Children, XVII (March, 1980), 33-36.

[3]Ibid., p. 33.

[4]Ibid., p. 33.

[5]The twelve subject categories were those used by the Museum of Science and Industry in Chicago, Illinois in the organization of their 8th. Annual Children's Science Book Fair in October, 1980 which included the "Outstanding Science Trade Books for Children in 1979."

Each illustration was assigned to a sex-role content category. Within each subject category, there were tabulations of the numbers of illustrations in each sex-role content category. To identify differences in the numbers of illustrations in which individual males and females, groups of males and females, and mixed-sex groups were portrayed, percentages were computed. These percentages were calculated for each subject area category, the more inclusive categories of biological sciences and physical sciences and for the total sample.

The results suggest that similar to science textbook illustrations, trade book illustrations are sexist. For the total sample of illustrations, 61% were illustrations of one or more males. Thirty percent of the illustrations portrayed one or more females while 9% depicted mixed-sex groups. In separate analyses of the biological science and physical science book illustrations, there were some distinct contrasts. In the biological sciences males represented 39% of the illustrations with females portrayed in 48% of the illustrations and mixed-sex groups accounting for 13%. Tabulations are presented in Table 1. In contrast, 75% of the illustrations in physical science books were of males with 18% females and 7% mixed-sex groups. Tabulations are presented in Table 2.

Animals comprised the largest category of books in the total sample. Of the 31 animal books, 16 portrayed no humans. In the remaining 15 books, 64% of the illustrations were of males, 29% females, and 7% mixed-sex groups. The preponderance

TABLE 1

SEX-ROLE CONTENT IN BIOLOGICAL SCIENCE
TRADE BOOK ILLUSTRATIONS

Subject Category	No. of Books	Number of Illustrations				
		Sex-Role Content Categories				
		One Male	Two or More Males	One Female	Two or More Females	Mixed-sex Groups
Animals	31	5	21	33	3	8
Environment and Conservation	4	11	8	1	1	2
Life Sciences	7	38	4	83	32	29
Marine Life	2	0	0	2	0	0
Plant Life	2	5	3	1	1	4
Total	46	59	36	120	37	43

TABLE 2

SEX-ROLE CONTENT IN PHYSICAL SCIENCE
TRADE BOOK ILLUSTRATIONS

Subject Category	No. of Books	Number of Illustrations				
		Sex-Role Content Categories				
		One Male	Two or More Males	One Female	Two or More Females	Mixed-sex Groups
Astronomy	2	2	4	0	0	2
Aviation and Space	5	21	25	0	3	4
Earth Science	1	2	2	1	0	0
General Science	1	9	1	5	0	3
Physics and Chemistry	2	4	8	2	0	1
Technology and Engineering	7	40	27	24	3	4
Total	18	78	67	32	6	14

of males in some animal books was a consequence of historically accurate reporting. For authenticity, construction workers building the Panama Canal as well as Laplanders capturing reindeer were male. However, that recognized scientists were all males with one exception is not justified. Only Jane Goodall was shown observing chimpanzees while George Schaller observed lions. A book about snakes perpetuated the stereotype of girls' fear of snakes. In one illustration, two boys held a snake which was wrapped around the one's shoulder while in another picutre a lone girl looked at a snake in a cage. In an illustration of a girl and boy together, the boy confidently held the snake while the slightly smaller girl tentatively held out her hand to the snake.

In a separate category on marine life including two books, only two humans were portrayed. The one woman in each book was incidental to the content of the illustrations.

The ratio of the portrayal of females to males in the seven life science books' illustrations was 3:1. In only 16% of the illustrations were mixed-sex groups portrayed. There were both sexist and nonsexist portrayals of females in these illustrations. Some of the illustrations served only to reinforce sex-role stereotyping. A book describing skin shows a "before and after" picture of a woman who had had plastic surgery to improve her appearance, a group of girls performing ballet exercises and a man perspiring.

The photographs in the profusely illustrated, You Can't Catch Diabetes from a Friend[6] were splendidly nonsexist. The four sections of this book described the experiences of four diabetic children - two boys and two girls. All four children were shown in active, vigorous poses, including Colleen who hung from her knees on a jungle gym and Karen who rode a bicycle and injected herself with insulin. Period[7] which explored the onset of menstruation and related physical changes showed young girls participating in energetic competitive outdoor sports such as football and tennis. Illustrations of the grandmother in How Does It Feel to Be Old? Presented the image of a mature woman who was independent and assertive. In contrast, a quite sexist life science book about the heart portrayed no females. In one illustration two male surgeons performed an operation while in another a male doctor took a boy's blood pressure.

One of the two books about plants comprehensively investigated the history and contemporary status of marijuana. Males in the illustrations were customs agents and cannabis crop inspectors. Women ranged from a Ukranian preparer of hemp to a group in an 1876 hashish den.

Eighty-two percent of the illustrations in the four environment and conservation books portrayed males with nine

[7]Jo Ann Gardner-Loulan, Bonnie Lopez and Marcia Quackenbush, Period, Illustrated by Marcia Quackenbush (San Francisco, California: New GIde Publishing Co., 1979).

[8]Norma Farber, How Does It Feel to Be Old? Illustrated by Trina Schart Hyman (New York: E. P. Dutton, 1979).

percent each portraying females and mixed-sex groups. Photographs illustrating the ecology of natural fire depicted a male firefighter, bulldozer operator and forest ranger. A book on alternate energy sources portrayed only males researching an experimental windmill, solar-cell powered cart and solar cooker. The sketches in An Oak Tree Dies and a Journey Begins[9] were delightfully nonsexist. Girls rode a drifting log, boys cooked on the beach and best of all, a boy and girl together sat on a log fishing.

While numbers of females in illustrations exceeded numbers of males in the biological science trade books, the reverse was true in physical science. To investigate differences among the individual categories of physical science trade book illustrations, each of the six categories was analyzed quantitatively and examined qualitatively.

Only one book could be assigned to the earth science category. Of the five illustrations, four portrayed male scientists studying earth quakes with seismometers and other instruments. The only female portrayed was a mother who with her baby was standing in the ruins of an earth quake.

The one book in the general science category presented science activities with ball-point pens. The ratio of males to females was 2:1. Only three of the eighteen illustrations portrayed males and females working together. Boys were shown in the more active roles such as mixing ink and detergent

[9]Louanne Norris and Howard E. Smith, Jr., An Oak Tree Dies and a Journey Begins, Illustrated by Allen Davis (New York: Crown Publishing Co., 1979).

and constructing a short-interval timer. Girls were depicted in more passive roles, for example, holding a paper on which ink was drying and observing thermometers in two containers of water.

One of the two astronomy books portrayed no humans. The other portrayed females and males in two photographs and males only in the remaining six. With their convincing realism, these photographs from NASA seemed to suggest that astronomers are male.

An even greater preponderance of males relative to females was exhibited in the five aviation and space books. Eighty-seven percent of the illustrations were of males compared to six percent for females. Portrayals of mixed-sex groups accounted for seven percent. A couple of the books included illustrations of women in training as astronauts. Interestingly, the setting of one of these few illustrations was a space shuttle's kitchen facilities.

In the two physics and chemistry books, the ratio of males to females was 8:1. Males were represented in various related careers, while only two (nuclear engineer and assembly line worker) were shown for women. Again, there was an implied sexist definition of career roles.

Sixty-eight percent of the illustrations in the seven technology and engineering books portrayed males and twenty-eight percent portrayed females. Illustrations showing mixed-sex groups accounted for only four percent of the total number indicating a very sex-segregated portrayal.

A book including no females explored the topic of speed. Males raced cars, bicycles and horses. They skied, sky dived and rode motorcycles. Speed with its risk and excitement was assumed to be a male domain.

In the biographies and careers category, only one of the four biographies was a woman's (Eugenie Clark) biography. The one career book which was partially a collective biography of astronauts did include those few women who were astronaut candidates.[10]

A superficial examination of the data revealed that most illustrations portrayed individual females and males. Comparatively few illustrations depicted males and females working together. Even fewer depicted females as a team. In an analysis of the relative sex segregation and integration in the total number of illustrations depicting two or more individuals, it was found that in only 26% were both males and females portrayed. Fifty-five percent of these illustrations were restricted to males and nineteen percent to females.

A further analysis of the relative segregation and integration in the biological and physical science trade books was conducted. In the biological science books, the percentage of group pictures illustrating only males and only females was identical - thirty-one percent. Thirty-eight percent of the group pictures portrayed males and females together. In the physical science books a quite

[10]In this separate category, there were 85 illustrations of one male, 31 of two or more males, six of one female, two of two or more females and six of mixed-sex groups.

different situation was found. Seventy-seven percent of the group pictures showed only males while seven percent showed only females. Sixteen percent illustrated males and females in groups.

These outstanding science trade books constitute a relatively small fraction of the total number of recently published children's science trade books. Since these outstanding books were evaluated for sexism in the selection process, it could be assumed that many of those not selected would be significantly more sexist. Systematic analyses of other samples of science trade books need to be conducted. Analyses of larger numbers of books in each of the specified categories could determine the validity of the trends found in the present analysis. Qualitative analyses should be a follow-up to quantitative analyses. Is one sex more dominant? Is one more active or passive? Is there bias in the portrayal of career roles? Illustrations of females and males in mixed-sex groups need to be examined more critically. Are stereotyped sex-roles assumed by either sex? Similarly, illustrations of groups of males could be compared to illustrations of groups of females. Are there differences in the ways in which grups of females and males are portrayed.

As long as children are exposed to sexist illustrations in science trade books, their perception of science interests, activities and careers is likely to be biased. If boys and girls are to believe that girls and women are equally capable of successfully participating in all levels and

types of scientific endeavors, they must observe credible evidence of this. Only then will children be aware of their options in pursuing scientific activities, training and careers.

With the increasing number of science trade books published each year, editors and publishers should expect nonsexist illustrations to the same degree which they require nonsexist narrative. Since many science trade books are illustrated with photographs, it may sometimes be necessary for the photographer to search specifically for women in scientific careers and activities. More young girls actively involved in science experiences and groups of males and females in equivalent roles should become the subjects of photographs. Similarly, artists other than photographers should become conscious of and avoid sexism in their illustrations.

Finally, since it would be neither possible nor desirable to deny children all science trade books except those in which the illustrations have met reasonable criteria for sexism, children themselves can develop a sensitivity to sexism in illustrations. If they recognize the bias and its injustice, they may be less influenced by it. As their selection process becomes more critical and questioning, they will hopefully prefer nonsexist books.

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